

TAXONOMIC STATUS OF VICIA HASSEI (LEGUMINOSAE)

J. STUART LASSETTER

Department of Biological Sciences,
Eastern Kentucky University, Richmond 40475

The relationship between *Vicia hassei* and *Vicia exigua* has been a source of taxonomic confusion. Both taxa are annuals, setting seed by late spring or early summer. Both usually have one or two small inconspicuous flowers per raceme. *Vicia exigua* was described by Nuttall in Torrey and Gray in 1838. *Vicia exigua* of this paper refers only to California and Baja California populations attributed to that species. *Vicia hassei* was described by Watson in 1890, and Jepson in 1901 reduced it to a variety of *V. exigua*. More recent floristic workers (e.g., Howell, 1949; Munz, 1959; and Thomas, 1961) have followed Jepson's concept.

MATERIALS AND METHODS

Specimens from the following herbaria were examined: ARIZ, BRY, CAS, COLO*, DS, F*, ISC, LA, MEXU*, MICH*, MIN, MO, NY, ORE, PH*, POM*, RSA, SBBG, SBM, SD, SMU, TEX, UARK, UC, US. Asterisks indicate selected material only was studied.

Buds collected from field and greenhouse plants were used for anther squashes, and root tips were used for karyotype studies (see Lassetter, 1972, for details). Voucher specimens are deposited at ISC. Field studies included procurement of mass collections as well as observation of pollinators and habitat characteristics. Plants were not fruiting during the field-work period, but viable seeds were obtained from herbarium specimens.

RESULTS AND DISCUSSION

Examination of mass collections and herbarium specimens revealed two qualitative characteristics in *V. hassei* that are absent in *V. exigua*. Stylar pubescence in *V. hassei* is very dense and concentrated on the lower side of the style; this arrangement of hairs is termed the stylar brush. Secondly, the ovaries and legumes are pubescent (fig. 1). *Vicia exigua* has much sparser pubescence evenly distributed around the style (and, therefore, no stylar brush) and has glabrous ovaries and legumes (fig. 1). In addition, leaflet apices of *V. hassei* are mostly truncate or often emarginate with two or three mucros, whereas *V. exigua* leaflets are mostly acute or obtuse. These latter characteristics, however, are not wholly consistent, especially in young or stunted specimens of *V. hassei*.

Chromosome numbers in both taxa are $2n = 7 \text{ II}$, and no meiotic irregularities were observed (Lassetter, 1972). All root-tip preparations counted were $2n = 14$. These numbers are the first reports for *V. exigua* Nutt. (sensu stricto) and *V. hassei*.

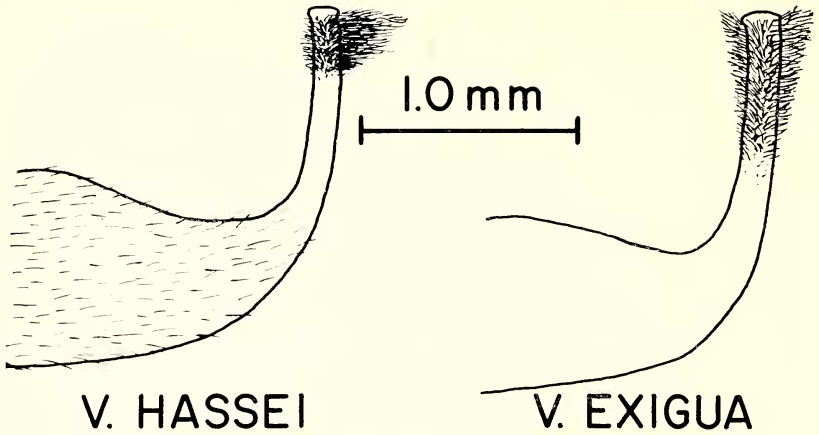


FIG. 1. Ovary apices, styles, and stigmas of *Vicia hassei* and *V. exigua*.

Karyotypes of *V. hassei* and *V. exigua* are given in Figure 2, and they obviously are different, as is most often the case in *Vicia* species (Sveshnikova, 1927; Shrivastava, 1963; Mettin and Hanelt, 1968). The largest two chromosome pairs in *V. hassei* are metacentric, with secondary constrictions very near the centromere. In *V. exigua*, no secondary constrictions were observed, and the smallest pair of chromosomes is satellited. Chromosomes of *V. hassei* are larger (fig. 2).

Field study revealed little difference in habitat preference between the two taxa, and both may be found in close proximity. Populations occur on a variety of soils, ranging from very sandy to rocky, but only *V. hassei* was found on fine-textured clay "dry-bog" soils.

Pollinators were not observed visiting flowers of these taxa. Bagging of greenhouse plants showed both taxa to be self-fertile, and bagging of single flowers indicated that the stigma receives pollen from anthers of the same flower. Because pollination usually occurs just before or sometimes at the time the flowers open, pollinators, even if present, probably would have little effect on intrapopulational cross pollination. Prolific fruit and viable seed were produced by several generations of each taxon under greenhouse conditions.

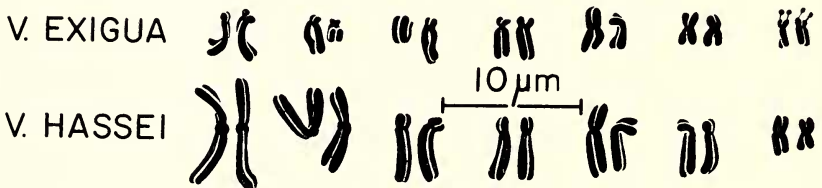


FIG. 2. Karyotypes of *V. exigua* (voucher grown from seed collected by I. Marin s.n., ISC) and *V. hassei* (voucher grown from seed from DS 401987).

Distributions of these taxa, determined from my own collections and herbarium data, are given in Figure 3. *Vicia hassei* extends from Baja California to Southern Oregon and is not found farther east than the San Joaquin Valley. *Vicia exigua* is almost wholly restricted to areas south of Los Angeles except for one collection from Shasta County, California (*Eastwood s.n.*, in 1912, US!). *Vicia hassei* is strictly a west coast taxon, while *V. exigua* is the westernmost extension of a group of interrelated taxa of the *Vicia ludoviciana* complex (*V. ludoviciana* Nutt., *V. leavenworthii* T. & G., *V. exigua* Nutt., and their infraspecific taxa). Relationships of this Texas-centered complex will be presented in a later publication.

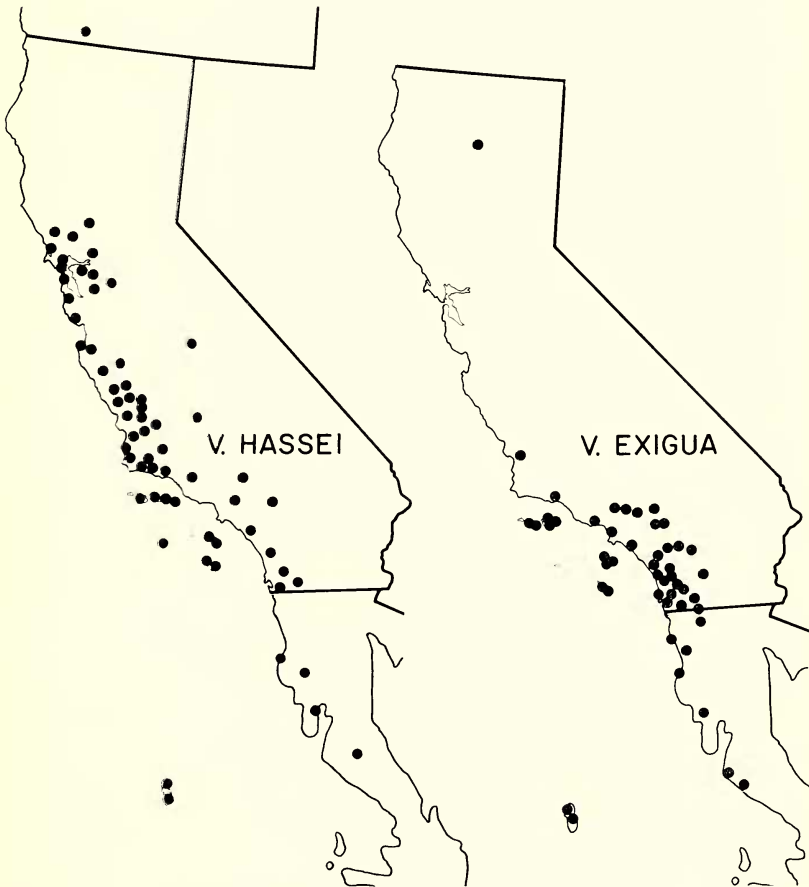


FIG. 3. Distribution of *V. hassei* and *V. exigua*.

CONCLUSIONS AND TAXONOMIC TREATMENT

On the basis of the aforementioned morphological, karyotypic, and distributional differences, I believe it most realistic to consider these taxa as separate species.

VICIA HASSEI S. Wats., Proc. Amer. Acad. Arts 25:129. 1890.—*Vicia exigua* Nutt. var. *hassei* (S. Wats.) Jeps., Fl. W. Mid. Calif. 296. 1901. Watson examined and cited several specimens from different collectors to formalize a species concept of *V. hassei*. From his cited material that I examined, I designate as LECTOTYPE: hills about Los Angeles with *V. exigua*, *H. E. Hasse s.n.*, 1888 (GH!). Other cited specimens that I examined are: Santa Cruz, *C. L. Anderson s.n.* (Syntype GH! Isosyntype PH!); Benecia, *Bigelow s.n.* (Syntype GH! Isosyntype NY!).

Vicia exigua Nutt. var. ?*californica* Torr., Pacific Railroad Reports 4:76 1856. TYPE: Benecia, *Bigelow s.n.* (the same collection cited by Watson for *V. hassei*). Holotype GH! Isotype NY!.

Herbaceous annual, usually robust, but sometimes flowering when less than 10 cm tall, short and stubby-branched to 60 cm or more tall and climbing. Leaflets (2) 4–8 (12), (1.5) 2.0–6.0 (9.0) mm wide and (8.0) 14.2–27.1 (40.0) mm long, the length-width ratio (1.9) 3.2–7.1 (9.0), the apices usually truncate to retuse or emarginate, often with more than one mucro. Flowers 1–2, arising at separate points on the peduncle, white to faint bluish or lavender, the length from calyx base to the tip of the unreflexed standard (6.2) 6.7–7.9 (8.8) mm, calyx teeth subequal, about 1.0 mm long or less, about half or less the length of the calyx tube, the tube (1.6) 2.0–2.6 (2.9) mm long. Styler pubescence a dense mass, obviously concentrated on the lower side, the hairs 0.25–0.45 mm long. Mature legumes 24–38 mm long, saber-shaped at the tip, the tip curved upward, the internode between two legumes great, 13.0–26.0 mm long. Ovules up to 10.

DISTRIBUTION: Southern Oregon to Baja California, near the coast and on some offshore islands (fig. 3). Lower elevations and near sea level, often among undergrowth and brush, grassy hills and slopes; canyons, arroyos, and ravines; creeks and flood plains; forest margins; only occasional on rights-of-way. In sandy to rocky and “dry-bog” clay soils. Flowering in March–April, fruiting in April–May.

VICIA EXIGUA Nutt. in T. & G., Fl. N. Amer. 1:272. 1838.—*Cracca exigua* (Nutt. in T. & G.) Alefeld, Bonplandia 9:119. 1861. TYPE: Columbia plains, *Nuttall s.n.*, (Isotype PH!). The holotype of *V. exigua* (BM) was collected by Nuttall from “the Columbia Plains”, but was not available for this study. A photograph was seen, however, and the type sheet contains two specimens. Howell in 1935 expressed some doubt as to the collection site of each specimen by the following note attached to the type sheet:

From the type description of *Vicia exigua* Nutt. (T. & G., Fl. N. A. 1:272) it is obvious Nuttall saw plants from California as well as from the Columbia. I believe that the two specimens on this sheet are from these two regions and that the California label has been lost. From the type description it is easy to determine that the left-hand specimen is the one from "the Oregon," the one on the right from "Upper California." 8/26/35 John Thomas Howell.

The right-hand specimen is definitely *V. exigua*, and I here designate it the lectotype. If this specimen were in fact collected from the Columbia Plains (Oregon) or even from northern California, as Howell believes, it must rank with Eastwood's Shasta Co. collection of *V. exigua* as an outlier from the more common southern California locations. From the type photograph, I cannot positively identify the left-hand specimen.

Herbaceous annual, diminutive to robust, 16–110 cm tall, sprawling to erect, climbing if support is available. Leaflets (4) 6–9 (12), (0.9) 1.6–3.4 (6.3) mm wide, and (9.0) 12.0–25.0 (37.0) mm long, the length-width ratio (3.6) 5.8–11.2 (16.4), the apices acute to truncate. Flowers 1–3, rarely 4, occurring singly at points on the peduncle (but almost contiguous), or 2 flowers arising from the same point, bluish, the length of the flower from calyx base to the tip of the unreflexed standard (4.3) 4.4–6.5 (7.5) mm. Upper calyx teeth usually slightly shorter than the lowest tooth, the lowest tooth (0.9) 1.1–1.5 (1.7) mm long, usually more than half the length of the calyx tube, the tube (1.3) 1.6–2.0 (2.2) mm long. Styler pubescence more or less evenly distributed around the style, the hairs 0.08–0.15 mm long. Mature legumes 15–26 mm long, oblique at both ends, the 2 or more legumes contiguous or nearly so. Ovules up to 7.

DISTRIBUTION: Southern California and Baja California; one distant collection from northern California seen (fig. 3). Wooded areas; moist slopes, ravines, and canyons; foothills; along creeks; chaparral; beaches; dry wasteland. Sandy to rocky soil. Flowering in (February–March) April–May; fruiting in (February) April–May (June).

ACKNOWLEDGMENTS

I express sincere gratitude to Dr. Duane Isely for his suggestion of the initial dissertation problem and his guidance throughout this study, which represents a portion of a dissertation submitted as partial fulfillment of the requirements for the Degree of Doctor of Philosophy in Botany, Iowa State University, Ames, 1972. Journal Paper No. J-7850 of the Iowa Agriculture and Home Economics Experiment Station, Ames, Iowa. Project 1814. The facilities of the Iowa State Herbarium, supported by the Science and Humanities Research Institute, were used in the preparation of this paper. The Iowa State University Agriculture and Home Economics Experiment Station provided funds for laboratory supplies and some field travel. Field work was supported by N. S. F. Grant GB-27935. Appreciation is extended to the curators of the herbaria mentioned herein

for their courtesy in arranging loans and in permitting my examination of specimens, and to Clare B. Hardham and the late Ernest C. Twissle-mann for allowing examination of their personal collections. Ingrid Marin collected viable *V. exigua* seed from Riverside Co., California.

LITERATURE CITED

- HOWELL, J. T. 1949. Marin flora. Univ. Calif. Press, Berkeley.
 LASSETTER, J. S. 1972. A biosystematic study of the *Vicia ludoviciana* complex (Leguminosae). Ph.D. Thesis. Iowa State Univ., Ames.
 METTIN, D., and P. HANELT. 1968. Bemerkungen zur Karyologie und Systematik einiger Sippen der Gattung *Vicia* L. Feddes Repert. 77:11-30.
 MUNZ, P. A. 1959. A California flora. Univ. Calif. Press, Berkeley.
 SHRIVASTAVA, L. M. 1963. Cytogenetical studies in certain species of *Vicia*. Cytologia 28:154-169.
 SVESHNIKOVA, I. N. 1927. Karyological studies on *Vicia*. Trudy Prikl. Bot. 17-1, No. 3:37-72. Russian with English summary.
 THOMAS, J. H. 1961. Flora of the Santa Cruz Mountains of California. Stanford Univ. Press, Stanford, Calif.

CORRECTION OF THE GEOGRAPHIC DISTRIBUTION OF *RHUS MICROPHYLLA* (ANACARDIACEAE).—Barkley (Ann. Missouri Bot. Gard. 24:256-500. 1937) in his monograph of North American *Rhus* included a distribution map (pg. 388) of *Rhus microphylla* Engelm. ex Gray showing its geographic distribution as including Cedros Island and Puerto San Bartolome, Baja California, Mexico. Cedros Island and the adjacent coast were also shown as localities for *R. microphylla* by Shreve and Wiggins (*Vegetation and flora of the Sonoran Desert*, Stanford Univ. Press. 1964) and Hastings, Turner, and Warren (*An atlas of some plant distributions in the Sonoran Desert*, Univ. of Arizona. 1972). Hastings et al. pointed out that this rather formidable disjunction is puzzling, since *R. microphylla* is primarily a Chihuahuan Desert species, and that they had not seen specimens from either locality.

In spring 1972 and 1973 I specifically searched for *R. microphylla* on Cedros Island in areas that seemed suitable for its growth. I was unable to locate it, but in all these areas there was an abundance of *Pachycormus discolor* var. *veatchiana* (Kell.) Gentry. Curiously, the disjunct localities reported for *R. microphylla* in the Sonoran Desert fall within the known distribution of *P. discolor* var. *veatchiana*. Because of this and the superficial resemblance of these two species, I borrowed specimens (Cedros Island, 8 Dec 1888, *Pond s. n.*, and Port San Bartolome, 27 Nov 1889, *Pond s. n.*) from the University of Notre Dame on which this distribution of *R. microphylla* is based. Although both specimens are sterile branches, they are easily recognized as *P. discolor* and not *R. microphylla*, since the leaves are borne in fascicles (Kellogg, Proc. Calif. Acad. Sci. 2:24. 1860). Also, on the specimen from Cedros Island there is a card written by Lt. Pond stating, "low shrubby bush 18 inches high, four feet across, branching at the ground into four stems, two inches each in diameter, bark peeling, single stem from a tree like above six feet high, six inches thick." The thick stem and peeling bark are both characteristic of *P. discolor* but not *R. microphylla*. I have annotated these specimens as *Pachycormus discolor* var. *veatchiana*. Oddly, they were not annotated by Barkley as *R. microphylla*. *Rhus microphylla* is restricted to the southwestern United States and northern mainland Mexico, but it does not occur in Baja California. I thank Dr. T. Crovello of ND for the loan of the *Pachycormus* specimens.—DAVID A. YOUNG, Rancho Santa Ana Botanic Garden, Claremont, California 91711.